

535,227

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



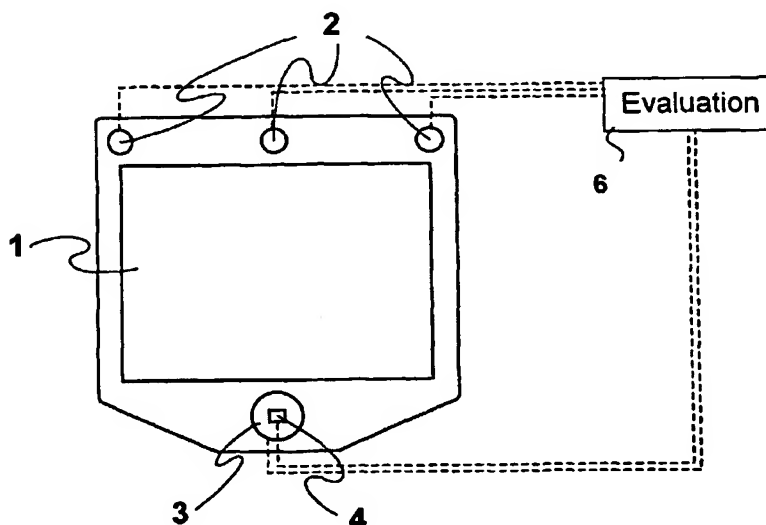
(43) International Publication Date
3 June 2004 (03.06.2004)

PCT

(10) International Publication Number
WO 2004/045399 A1

- (51) International Patent Classification⁷: **A61B 3/10, 3/14** (74) Agent: **BERGENSTRÄHLE & LINDVALL AB**; Box 17704, S-118 93 Stockholm (SE).
- (21) International Application Number: PCT/SE2003/001813 (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: 21 November 2003 (21.11.2003)
- (25) Filing Language: Swedish
- (26) Publication Language: English
- (30) Priority Data: 0203457-7 21 November 2002 (21.11.2002) SE
- (71) Applicant (*for all designated States except US*): **TOBII TECHNOLOGY AB** [SE/SE]; Löjtnantsgatan 25, S-115 50 Stockholm (SE).
- (72) Inventors; and (74) Inventors/Applicants (*for US only*): **ELVESJÖ, John** [SE/SE]; Fridhemsgatan 60, 3 tr, S-112 46 Stockholm (SE). **SKOGÖ, Mårten** [SE/SE]; Sankt Göransgatan 153, 5 tr, S-112 51 Stockholm (SE). **ELVERS, Gunnar** [SE/SE]; Torsviksvägen 37, BV, S-181 34 Lidingö (SE).
- (84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: METHOD AND INSTALLATION FOR DETECTING AND FOLLOWING AN EYE AND THE GAZE DIRECTION THEREOF



(57) Abstract: When detecting the position and gaze direction of eyes, a photo sensor (1) and light sources (2, 3) placed around a display (1) and a calculation and control unit (6) are used. One of the light sources is placed around the sensor and includes inner and outer elements (3'; 3''). When only the inner elements are illuminated, a strong bright eye effect in a captured image is obtained, this resulting in a simple detection of the pupils and thereby a safe determination of gaze direction. When only the outer elements and the outer light sources (2) are illuminated, a determination of the distance of the eye from the photo sensor is made. After it has been possible to determine the pupils in an image, in the following captured images only those areas around the pupils are evaluated where the images of the eyes are located. Which one of the eyes that is the left eye and the right eye can be determined by following the images of the eyes and evaluating the positions thereof in successively captured images.

WO 2004/045399 A1